RUN-TIME RESOURCE MANAGEMENT IN FAULT-TOLERANT NETWORK ON RECONFIGURABLE CHIPS

Mohammad Hosseinabady
m.hosseinabady@bristol.ac.uk
University of Bristol, Bristol, UK

Jose L. Nunez-Yanez
j.l.nunez-yanez@bristol.ac.uk
University of Bristol, Bristol, UK

ABSTRACT

This poster investigates the challenges of run-time resource management in future coarse-grained network-on-reconfigurable-chips (NoRCs). Run-time reconfiguration is a key feature expected in future processing systems which must support multiple applications whose processing requirements are not known at design time. This paper investigates a stochastic routing algorithm in a NoC-based system with dynamically reconfigurable tiles, able to cope with the dynamic behaviour of run-time task mapping. Experimental results show the efficiency of the proposed stochastic task mapping.

NETWORK ON RECONFIGURABLE CHIP

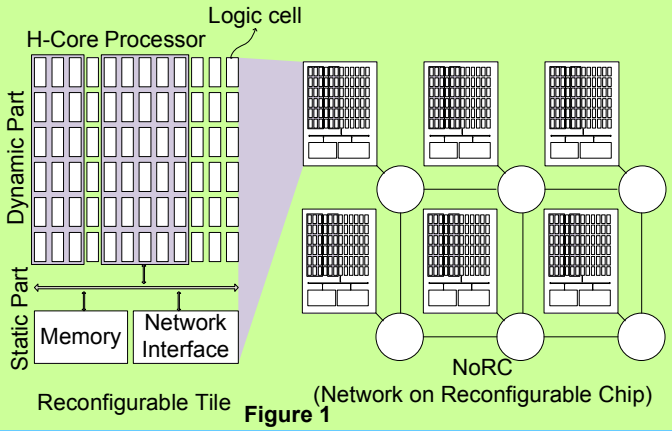


Figure 1

PROPOSED RANDOM ROUTING

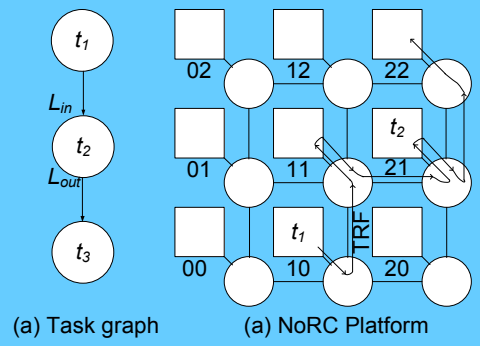


Figure 2

TASK MAPPING GUIDELINES

The random walk should follow the following constraints to be able to map a task to a Partially Reconfigurable Region (PRR), efficiently.

Constraint 1: Finding an existing task

Constraint 2: Finding a PRR which fits the task

Constraint 3: Minimize the communication overhead between two communicating tasks

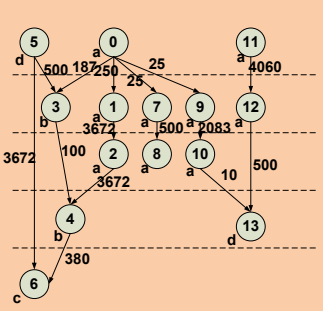
We define a few metrics to numerically denote these constraints. Network interface of tiles save these numbers as guidelines for the randomly travelled flit.

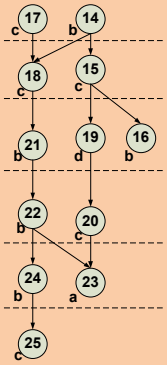
PRR factors: PR number (*PRN*) *and* PR distance (*PRD*) factors

Task factors: Task number *(TN) and* Task distance (*TD*) factors

EXPERIMENTAL RESULTS

To evaluate the proposed technique, we simulate 10000 times the two applications shown in Figure 3(a), (b). The *App1* and *App2* application task graphs are based on the task graphs of a 263 decoder mp3 decoder (*App1*) , a multi-window display (MWD) (*App2*).





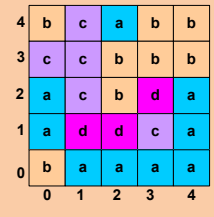
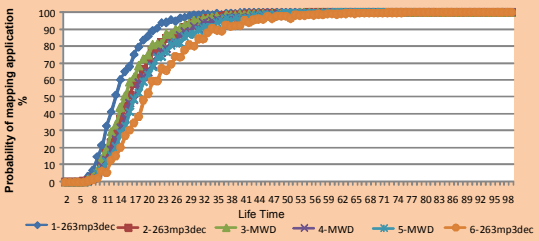


Figure 3



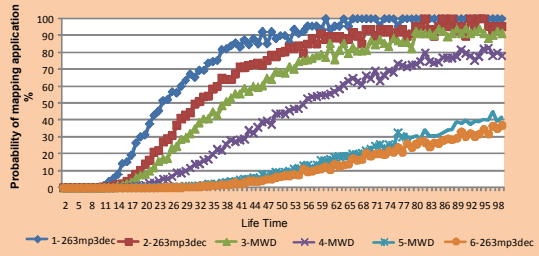
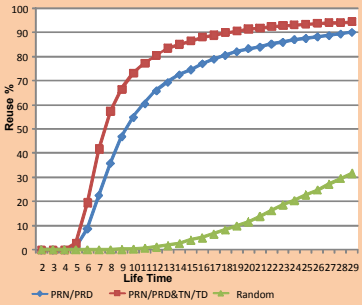


Figure 4



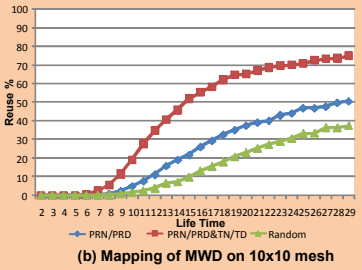


Figure 5